



General

Guideline Title

Febrile seizures: guideline for the neurodiagnostic evaluation of the child with a simple febrile seizure.

Bibliographic Source(s)

American Academy of Pediatrics, Subcommittee on Febrile Seizures. Clinical practice guideline - febrile seizures: guideline for the neurodiagnostic evaluation of the child with a simple febrile seizure. Pediatrics. 2011 Feb;127(2):389-94. [23 references] [PubMed](#)

Guideline Status

This is the current release of this guideline.

This guideline updates a previous version: Practice parameter: the neurodiagnostic evaluation of the child with a first simple febrile seizure. Pediatrics 1996 May;97(5):769-72. [15 references]

All policy statements from the American Academy of Pediatrics automatically expire 5 years after publication unless reaffirmed, revised, or retired at or before that time.

Recommendations

Major Recommendations

Definitions for the quality of the evidence (A-D, X) and the strength of the recommendation (strong recommendation, recommendation, option) are provided at the end of the "Major Recommendations" field.

Action Statement 1

Action Statement 1a

A lumbar puncture should be performed in any child who presents with a seizure and a fever and has meningeal signs and symptoms (e.g., neck stiffness, Kernig and/or Brudzinski signs) or in any child whose history or examination suggests the presence of meningitis or intracranial infection.

- Aggregate evidence level: B (overwhelming evidence from observational studies)
- Benefits: Meningeal signs and symptoms strongly suggest meningitis, which, if bacterial in etiology, will likely be fatal if left untreated.
- Harms/risks/costs: Lumbar puncture is an invasive and often painful procedure and can be costly.
- Benefits/harms assessment: Preponderance of benefit over harm
- Value judgments: Observational data and clinical principles were used in making this judgment.
- Role of patient preferences: Although parents may not wish to have their child undergo a lumbar puncture, health care providers should

explain that if meningitis is not diagnosed and treated, it could be fatal.

- Exclusions: None
- Intentional vagueness: None
- Policy level: Strong recommendation

Action Statement 1b

In any infant between 6 and 12 months of age who presents with a seizure and fever, a lumbar puncture is an option when the child is considered deficient in *Haemophilus influenzae* type b (Hib) or *Streptococcus pneumoniae* immunizations (i.e., has not received scheduled immunizations as recommended) or when immunization status cannot be determined because of an increased risk of bacterial meningitis.

- Aggregate evidence level: D (expert opinion, case reports)
- Benefits: Meningeal signs and symptoms strongly suggest meningitis, which, if bacterial in etiology, will likely be fatal or cause significant long-term disability if left untreated.
- Harms/risks/costs: Lumbar puncture is an invasive and often painful procedure and can be costly.
- Benefits/harms assessment: Preponderance of benefit over harm
- Value judgments: Data on the incidence of bacterial meningitis from before and after the existence of immunizations against Hib and *S. pneumoniae* were used in making this recommendation.
- Role of patient preferences: Although parents may not wish their child to undergo a lumbar puncture, health care providers should explain that in the absence of complete immunizations, their child may be at risk of having fatal bacterial meningitis.
- Exclusions: This recommendation applies only to children 6 to 12 months of age. The subcommittee felt that clinicians would recognize symptoms of meningitis in children older than 12 months.
- Intentional vagueness: None
- Policy level: Option

Action Statement 1c

A lumbar puncture is an option in the child who presents with a seizure and fever and is pretreated with antibiotics, because antibiotic treatment can mask the signs and symptoms of meningitis.

- Aggregate evidence level: D (reasoning from clinical experience, case series)
- Benefits: Antibiotics may mask meningeal signs and symptoms but may be insufficient to eradicate meningitis; a diagnosis of meningitis, if bacterial in etiology, will likely be fatal if left untreated.
- Harms/risks/costs: Lumbar puncture is an invasive and often painful procedure and can be costly.
- Benefits/harms assessment: Preponderance of benefit over harm
- Value judgments: Clinical experience and case series were used in making this judgment while recognizing that extensive data from studies are lacking.
- Role of patient preferences: Although parents may not wish to have their child undergo a lumbar puncture, medical providers should explain that in the presence of pretreatment with antibiotics, the signs and symptoms of meningitis may be masked. Meningitis, if untreated, can be fatal.
- Exclusions: None
- Intentional vagueness: Data are insufficient to define the specific treatment duration necessary to mask signs and symptoms. The committee determined that the decision to perform a lumbar puncture will depend on the type and duration of antibiotics administered before the seizure and should be left to the individual clinician.
- Policy level: Option

Action Statement 2

An electroencephalogram (EEG) should not be performed in the evaluation of a neurologically healthy child with a simple febrile seizure.

- Aggregate evidence level: B (overwhelming evidence from observational studies)
- Benefits: One study showed a possible association with paroxysmal EEGs and a higher rate of afebrile seizures.
- Harms/risks/costs: EEGs are costly and may increase parental anxiety.
- Benefits/harms assessment: Preponderance of harm over benefit
- Value judgments: Observational data were used for this judgment.
- Role of patient preferences: Although an EEG might have limited prognostic utility in this situation, parents should be educated that the study will not alter outcome.

- Exclusions: None
- Intentional vagueness: None
- Policy level: Strong recommendation

Action Statement 3

The following tests should not be performed routinely for the sole purpose of identifying the cause of a simple febrile seizure: measurement of serum electrolytes, calcium, phosphorus, magnesium, or blood glucose or complete blood cell count.

- Aggregate evidence level: B (overwhelming evidence from observational studies)
- Benefits: A complete blood cell count may identify children at risk for bacteremia; however, the incidence of bacteremia in febrile children younger than 24 months is the same with or without febrile seizures.
- Harms/risks/costs: Laboratory tests may be invasive and costly and provide no real benefit.
- Benefits/harms assessment: Preponderance of harm over benefit
- Value judgments: Observational data were used for this judgment.
- Role of patient preferences: Although parents may want blood tests performed to explain the seizure, they should be reassured that blood tests should be directed toward identifying the source of their child's fever.
- Exclusions: None
- Intentional vagueness: None
- Policy level: Strong recommendation

Action Statement 4

Neuroimaging should not be performed in the routine evaluation of the child with a simple febrile seizure.

- Aggregate evidence level: B (overwhelming evidence from observational studies)
- Benefits: Neuroimaging might provide earlier detection of fixed structural lesions, such as dysplasia, or very rarely, abscess or tumor.
- Harms/risks/costs: Neuroimaging tests are costly, computed tomography (CT) exposes children to radiation, and magnetic resonance imaging (MRI) may require sedation.
- Benefits/harms assessment: Preponderance of harm over benefit
- Value judgments: Observational data were used for this judgment.
- Role of patient preferences: Although parents may want neuroimaging performed to explain the seizure, they should be reassured that the tests carry risks and will not alter outcome for their child.
- Exclusions: None
- Intentional vagueness: None
- Policy level: Strong recommendation

Conclusions

Clinicians evaluating infants or young children after a simple febrile seizure should direct their attention toward identifying the cause of the child's fever. Meningitis should be considered in the differential diagnosis for any febrile child, and lumbar puncture should be performed if the child is ill-appearing or if there are clinical signs or symptoms of concern. A lumbar puncture is an option in a child 6 to 12 months of age who is deficient in Hib and *S. pneumoniae* immunizations or for whom immunization status is unknown. A lumbar puncture is an option in children who have been pretreated with antibiotics. In general, a simple febrile seizure does not usually require further evaluation, specifically EEGs, blood studies, or neuroimaging.

Definitions:

Strength of the Recommendations

A strong recommendation means that the committee believes that the benefits of the recommended approach clearly exceed the harms of that approach (or, in the case of a strong negative recommendation, that the harms clearly exceed the benefits) and that the quality of the evidence supporting this approach is either excellent or impossible to obtain. Clinicians should follow such guidance unless a clear and compelling rationale for acting in a contrary manner is present.

A recommendation means that the committee believes that the benefits exceed the harms (or, in the case of a negative recommendation, that the harms exceed the benefits), but the quality of the evidence on which this recommendation is based is not as strong. Clinicians also generally should follow such guidance but also should be alert to new information and sensitive to patient preferences.

An option means either that the evidence quality that exists is suspect or that well-designed, well-conducted studies have demonstrated little clear advantage to one approach versus another. Options offer clinicians flexibility in their decision-making regarding appropriate practice, although they may set boundaries on alternatives. Patient preference should have a substantial role in influencing clinical decision-making, particularly when policies are expressed as options.

No recommendation is made when there is both a lack of pertinent evidence and an unclear balance between benefits and harms. Clinicians should feel little constraint in their decision-making when addressing areas with insufficient evidence. Patient preference should have a substantial role in influencing clinical decision-making

Evidence Quality

A	Well-designed randomized controlled trials (RCTs) or diagnostic studies on relevant population
B	RCTs or diagnostic studies with minor limitations; overwhelmingly consistent evidence from observational studies
C	Observational studies (case-control and cohort design)
D	Expert opinion, case reports, reasoning from first principles
X	Exceptional situations where validating studies cannot be performed and there is a clear preponderance of benefit or harm

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Simple febrile seizure

Guideline Category

Diagnosis

Evaluation

Clinical Specialty

Emergency Medicine

Family Practice

Neurology

Nursing

Pediatrics

Intended Users

Advanced Practice Nurses

Nurses

Physician Assistants

Physicians

Guideline Objective(s)

- To formulate evidence-based recommendations for health care professionals about the diagnosis and evaluation of a simple febrile seizure in infants and young children 6 through 60 months of age
- To revise the practice guideline published by the American Academy of Pediatrics (AAP) in 1996

Target Population

Neurologically healthy infants and children between 6 months and 5 years of age who have had a simple febrile seizure and present for evaluation within 12 hours of the event

Note: This practice guideline is not intended for patients who have had complex febrile seizures (prolonged, focal, and/or recurrent), and it does not pertain to children with previous neurologic insults, known central nervous system abnormalities, or history of afebrile seizures.

Interventions and Practices Considered

1. Lumbar puncture
2. Electroencephalography (EEG) (not recommended)
3. Blood studies—serum electrolytes, calcium, phosphorus, magnesium, and blood glucose, and a complete blood count (CBC) (not recommended routinely)
4. Neuroimaging—skull radiographs, computed tomography (CT), and magnetic resonance imaging (not recommended routinely)

Major Outcomes Considered

- Sensitivity and specificity of lumbar puncture to identify bacterial meningitis
- Effect of antibiotic pretreatment on the course of bacterial meningitis
- Relationship of electroencephalography, computed tomography, magnetic resonance imaging, and routine blood tests to patient outcome
- Incidence of intracranial structural abnormalities in this patient population

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

A comprehensive review of the evidence-based literature published from 1996 to February 2009 was conducted in the PubMed database to discover articles that addressed the diagnosis and evaluation of children with simple febrile seizures.

The subcommittee member who reviewed the literature for the 1996 American Academy of Pediatrics practice guidelines searched for articles published since the last guideline through 2009, supplemented by articles submitted by other committee members. Results from the literature search were provided to the subcommittee members for review. Interventions of direct interest included lumbar puncture, electroencephalography, blood studies, and neuroimaging.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Evidence Quality

A	Well-designed randomized controlled trials (RCTs) or diagnostic studies on relevant population
B	RCTs or diagnostic studies with minor limitations; overwhelmingly consistent evidence from observational studies
C	Observational studies (case-control and cohort design)
D	Expert opinion, case reports, reasoning from first principles
X	Exceptional situations where validating studies cannot be performed and there is a clear preponderance of benefit or harm

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Preference was given to population-based studies for review, but given the scarcity of such studies, data from hospital-based studies, groups of young children with febrile illness, and comparable groups were reviewed. Decisions were made on the basis of a systematic grading of the quality of evidence and strength of recommendations. In the original practice parameter, 203 medical journal articles were reviewed and abstracted. An additional 372 articles were reviewed and abstracted for this update. Emphasis was placed on articles that differentiated simple febrile seizures from other types of seizures. Tables were constructed from the 70 articles that best fit these criteria.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

To update the clinical practice guideline on the neurodiagnostic evaluation of children with simple febrile seizures, the American Academy of Pediatrics (AAP) reconvened the Subcommittee on Febrile Seizures. The committee was chaired by a child neurologist and consisted of a neuroepidemiologist, 3 additional child neurologists, and a practicing pediatrician.

The evidence-based approach to guideline development requires that the evidence in support of a recommendation be identified, appraised, and summarized and that an explicit link between evidence and recommendations be defined. Evidence-based recommendations reflect the quality of evidence and the balance of benefit and harm that is anticipated when the recommendation is followed. The American Academy of Pediatrics (AAP) policy statement "Classifying Recommendations for Clinical Practice Guidelines" was followed in designating levels of recommendations (see the "Availability of Companion Documents" field).

Multiple issues were raised and discussed iteratively until consensus was reached about recommendations. The strength of evidence supporting

each recommendation and the strength of the recommendation were assessed by the committee member most experienced in informatics and epidemiology and graded according to AAP policy.

Rating Scheme for the Strength of the Recommendations

Strength of the Recommendations

A strong recommendation means that the committee believes that the benefits of the recommended approach clearly exceed the harms of that approach (or, in the case of a strong negative recommendation, that the harms clearly exceed the benefits) and that the quality of the evidence supporting this approach is either excellent or impossible to obtain. Clinicians should follow such guidance unless a clear and compelling rationale for acting in a contrary manner is present.

A recommendation means that the committee believes that the benefits exceed the harms (or, in the case of a negative recommendation, that the harms exceed the benefits), but the quality of the evidence on which this recommendation is based is not as strong. Clinicians also generally should follow such guidance but also should be alert to new information and sensitive to patient preferences.

An option means either that the evidence quality that exists is suspect or that well-designed, well-conducted studies have demonstrated little clear advantage to one approach versus another. Options offer clinicians flexibility in their decision-making regarding appropriate practice, although they may set boundaries on alternatives. Patient preference should have a substantial role in influencing clinical decision-making, particularly when policies are expressed as options.

No recommendation is made when there is both a lack of pertinent evidence and an unclear balance between benefits and harms. Clinicians should feel little constraint in their decision-making when addressing areas with insufficient evidence. Patient preference should have a substantial role in influencing clinical decision-making.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

The guideline was reviewed by members of the American Academy of Pediatrics (AAP) Steering Committee on Quality Improvement and Management; members of the AAP Section on Administration and Practice Management, Section on Developmental and Behavioral Pediatrics, Section on Epidemiology, Section on Infectious Diseases, Section on Neurology, Section on Neurologic Surgery, Section on Pediatric Emergency Medicine, Committee on Pediatric Emergency Medicine, Committee on Practice and Ambulatory Medicine, Committee on Child Health Financing, Committee on Infectious Diseases, Committee on Medical Liability and Risk Management, Council on Children With Disabilities, and Council on Community Pediatrics; and members of outside organizations including the Child Neurology Society, the American Academy of Neurology, the American College of Emergency Physicians, and members of the Pediatric Committee of the Emergency Nurses Association.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- Optimizing evaluation of the child who has had a simple febrile seizure by detecting underlying diseases, minimizing morbidity, and reassuring anxious parents and children
- Reducing the costs of physician and emergency department visits, hospitalizations, and unnecessary testing
- Educating the clinician to understand that a simple febrile seizure usually does not require further evaluation, specifically electroencephalography, blood studies, or neuroimaging

For benefits of specific interventions considered in the guideline, see the "Major Recommendations" field.

Potential Harms

- Lumbar puncture is an invasive and often painful procedure and can be costly.
- Laboratory tests may be invasive and costly and provide no real benefit.
- Neuroimaging tests are costly, computed tomography (CT) exposes children to radiation, and magnetic resonance imaging (MRI) may require sedation.

Qualifying Statements

Qualifying Statements

The recommendations in this report do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Patient Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

American Academy of Pediatrics, Subcommittee on Febrile Seizures. Clinical practice guideline - febrile seizures: guideline for the neurodiagnostic evaluation of the child with a simple febrile seizure. *Pediatrics*. 2011 Feb;127(2):389-94. [23 references] [PubMed](#)

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

1996 May (revised 2011 Feb)

Guideline Developer(s)

American Academy of Pediatrics - Medical Specialty Society

Source(s) of Funding

The American Academy of Pediatrics has neither solicited nor accepted any commercial involvement in the development of the content of this publication.

Guideline Committee

Subcommittee on Febrile Seizures, with oversight by the Steering Committee on Quality Improvement and Management

Composition of Group That Authored the Guideline

Subcommittee on Febrile Seizures, 2002–2010: Patricia K. Duffner, MD (neurology); Peter H. Berman, MD (neurology); Robert J. Baumann, MD (neuroepidemiology); Paul Graham Fisher, MD (neurology); John L. Green, MD (general pediatrics); Sanford Schneider, MD (neurology)

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Financial Disclosures/Conflicts of Interest

All authors have filed conflict of interest statements with the American Academy of Pediatrics. Any conflicts have been resolved through a process approved by the Board of Directors. No Subcommittee member has a conflict of interest.

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Guideline Availability

Electronic copies: Available from the [American Academy of Pediatrics \(AAP\) Policy Web site](#) .

Print copies: Available from AAP, 141 NW Point Blvd., P.O. Box 927, Elk Grove Village, IL 60009-0927.

Availability of Companion Documents

The following is available:

- Classifying recommendations for clinical practice guidelines. Pediatrics 2004;114(3):874–877. Electronic copies: Available from the [Pediatrics Journal Web site](#) .

Print copies: Available from AAP, 141 NW Point Blvd., P.O. Box 927, Elk Grove Village, IL 60009-0927.

Patient Resources

The following is available:

- Febrile seizures. Available from the [Healthy Children Web site](#) .

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

This summary was completed by ECRI on June 30, 1998. The information was verified by the guideline developer on December 1, 1998. This summary was updated by ECRI Institute on May 8, 2012.

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